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(54) BIAXIALLY STRETCHED LAMINATED POLYESTER FILM

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a biaxially stretched laminated polyester film which is excellent in ultraviolet ray shutting out ability, does not have troubles accompanying bleed out or the like, and for which a gas shutting out layer can easily be provided.

SOLUTION: This biaxially stretched laminated polyester film comprises at least three layers, which contains 0.1 to 9 wt.% of an ultraviolet absorbent on the internal layer, and the light transmission of 380 nm is 30% or lower. The ultraviolet absorbent is preferably an ultraviolet absorbent of a benzoxazine base.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention]

This invention relates to the biaxial oriented film which fitted the gas cutoff nature film especially about the film which was excellent in ultraviolet-rays cutoff capacity, and was excellent in transparency.

[0002]

[Description of the Prior Art]

Since polyester film has the outstanding mechanical property, thermal resistance, and the dimensional stability in an elevated temperature, the laminating of it is carried out to a sealant agent, and it is widely used for the package application of food, drugs, and cosmetics etc. as saccate. However, if oxygen exists inside in a bag during storage, contents will oxidize by ultraviolet rays and the problem which discolors or deteriorates will occur. When using for a package of the food and drugs which contain fats and oils and a coloring component especially, this problem is very serious and the package which removes oxygen completely is used using the package bag with ultraviolet-rays cutoff nature and oxygen cutoff nature.

[0003]

Although many aluminium foil and vacuum-plating-of-aluminium polyester film are used as such a package bag, contents cannot be seen and there is a problem of spoiling the design nature of goods.

As what solves this problem, a gas cutoff coat technique transparent in recent years progresses, and it has become the situation that transparent gas cutoff polyester film can be used. Moreover, the approach of carrying out the coat of the ultraviolet ray absorbent and the approach of blending an ultraviolet ray absorbent in polyester are proposed as an approach of intercepting ultraviolet rays.

[0004]

However, the approach of carrying out the coat of the ultraviolet ray absorbent and the

approach of engine performance of blending an ultraviolet ray absorbent in polyester are inadequate as a packing material (see the patent reference 1 and the patent reference 2). Moreover, it is going to improve ultraviolet-rays cutoff nature, if an ultraviolet ray absorbent is blended so much, sublimation of an ultraviolet ray absorbent, decomposition, etc. will take place at the time of film production, a problem cannot arise for productivity, and an ultraviolet ray absorbent cannot carry out bleed out to the film front face after film production, and a powerful gas barrier layer cannot be prepared. Because of these problems, it is transparent and it difficult to make simply a film with ultraviolet-rays cutoff nature and gas cutoff nature.

[0005]

[Patent reference 1] JP,4-163145,A

[Patent reference 2] JP,1-264843,A

[0006]

[Problem(s) to be Solved by the Invention]

This invention is made in view of the above-mentioned actual condition, the solution technical problem is excellent in ultraviolet-rays cutoff capacity, and does not have the evil accompanying bleed out etc., and the biaxial-stretching polyester film which can prepare a gas filter layer easily is offered.

[0007]

[Means for Solving the Problem]

According to the film which has a specific configuration as a result of inquiring wholeheartedly in view of the above-mentioned situation, this invention persons find out that the above-mentioned technical problem can be solved easily, and came to complete this invention.

[0008]

That is, the summary of this invention is biaxial-stretching laminating polyester film which contains an ultraviolet ray absorbent 0.1 to 9% of the weight in a inner layer and which consists of at least three layers, and consists in the biaxial-stretching laminating polyester film characterized by the light transmission of 380nm being 30% or less.

[0009]

[Embodiment of the Invention]

Hereafter, this invention is explained to a detail.

The polyester used for the biaxial-stretching laminating polyester film of this invention is polyester which is made to carry out melt polycondensation of a glycol like dicarboxylic acid [like terephthalic-acid, isophthalic acid, 2, 6-naphthalene dicarboxylic acid, adipic-acid, sebacic-acid, 4, and 4'-diphenyl dicarboxylic acid, 1, and 4-cyclohexyl dicarboxylic acid] or its ester and ethylene glycol, diethylene-glycol, triethylene glycol, propylene glycol, 1, 4-butanediol, neopentyl glycol, 1, and 4-cyclohexane dimethanol, and is manufactured.

[0010]

The polyester which consists of these acid components and glycol components can be manufactured to arbitration using the approach usually performed. For example, carry out whether aromatic series dicarboxylic acid and a glycol are made whether an ester exchange reaction is carried out between the low-grade alkyl ester of aromatic series dicarboxylic acid, and a glycol, or to esterify directly, the bis-glycol ester of aromatic series dicarboxylic acid or its low-grade polymer is made to form substantially, and the

approach of heating this under reduced pressure and subsequently, carrying out a polycondensation is adopted. Aliphatic series dicarboxylic acid may be copolymerized according to the purpose.

[0011]

As polyester of this invention, typically, although polyethylene terephthalate, polyethylene -2 and 6-naphthalate, Polly 1, 4-cyclohexane dimethylene terephthalate, etc. are mentioned, you may be polyester which copolymerized an above-mentioned acid component and an above-mentioned glycol component, and other components and additives may be contained if needed.

[0012]

These polyester can be made to contain the deposit particle which made organic particles and residual catalyst differences, such as inorganic particles, such as a calcium carbonate, a kaolin, a silica, an aluminum oxide, titanium oxide, an alumina, and a barium sulfate, acrylic resin, guanamine resin, and a fluororesin, particle-ize for the purpose of improving the performance traverse of a film. As for these particles, it is more desirable to blend with the outermost layer of the biaxial-stretching laminating polyester film of this invention. The particle size and the amount of these particles can be suitably decided according to the purpose. Moreover, various stabilizers, lubricant, an antistatic agent, etc. can also be added suitably.

[0013]

Although it is biaxial-stretching laminating polyester film which consists of at least three layers and it is the description to contain an ultraviolet ray absorbent 0.3 to 9% of the weight in a inner layer, if there are few ultraviolet ray absorbents than 0.3 % of the weight, ultraviolet-rays cutoff capacity is inadequate, if an ultraviolet ray absorbent exceeds 9 % of the weight, the fall of the molecular weight of polyester will arise, delamination arises in a laminating interface, and this invention film is not desirable as a film for a package.

[0014]

The film of this invention requires that the light transmission of 380nm should be 30% or less, and is 20% or less preferably. The discoloration or deterioration exceeding 30% of contents cannot be prevented, but the light transmission of 380nm is making preferably light transmission which is 380nm 20% or less 30% or less, and can prevent discoloration and deterioration of contents.

As an ultraviolet ray absorbent used by this invention, what is necessary is just the ultraviolet ray absorbent which polyester can be made to contain. For example, there are triazine compound, a benzophenone system compound, a benzotriazol system compound, a SARISHI rate system compound, a cyanoacrylate system compound, a benzoxazine system compound, etc. Also in these, a benzoxazine system compound has compatibility with polyester film, and since it can do light transmission of 380nm with 20% or less in an amount with comparatively few loadings, it is desirable. [good] As an example of a benzoxazine system compound, 2 and 2-(1, 4-phenylene) screw [4H-3 and 1-benzoxazine-4-ON] is mentioned.

[0015]

Although this invention film is biaxial-stretching laminating polyester film which consists of at least three layers and the ultraviolet ray absorbent is blended with the inner layer, the approach of carrying out the co-extrusion of the polyester containing an

ultraviolet ray absorbent and the polyester which contains a little ultraviolet ray absorbent, excluding an ultraviolet ray absorbent as the approach is good. Although it is desirable that there is no ultraviolet ray absorbent in the outermost layer, you may contain in the range which spoils neither the dirt of a process, nor the property of a film.

[0016]

Moreover, the thickness of the outermost layer has two fifths of the desirable range of the thickness of 0.5 micrometers to the whole film as a part for the thickness of one side. If the thickness of the outermost layer is too thin, bleed out of an ultraviolet ray absorbent may be unable to be prevented, the ultraviolet ray absorbents of the layer which makes an ultraviolet ray absorbent contain when too thick may increase in number, and it may become the cause of delamination.

As an example of the film production approach of a laminated film, two sorts (I, II) of polyester is extruded from two sets of extruders, carries out a laminating to two sorts of three layers (I/II/I) by opening Kaneuchi, and is fabricated in the shape of a sheet on melting extrusion and a cooling roller from a mouthpiece. The obtained sheet-like film is usually extended 2 to 7 times at 60-120 degrees C by the roll extending method, uniaxial-stretching polyester film is obtained, and, subsequently to [2 to 7 times], it is good by the film production approach of usually extending at 80-150 degrees C in the direction of a right angle with the previous extension direction within a tenter, and further usually performing heat treatment for 1 - 600 seconds at 150-250 degrees C. The easy-bonding layer which becomes a film after uniaxial stretching from water solubility or water-dispersion resin may be applied if needed.

[0017]

It is desirable to blend with the outermost layer of this invention film the particle which stated the performance traverse of a film previously for the purpose of improving. Moreover, although there is no limit in the thickness of the film of this invention, 6-75 micrometers is desirable as a film for a package.

The laminating of the oxygen filter layer is carried out to at least one side of the film of this invention, and it is desirable that the amounts of oxygen transparency of a film are below 20cc[m] 2 and day-atm. By preparing an oxygen filter layer depending on the contents of a package bag, even if ultraviolet-rays cutoff is not perfect, discoloration and deterioration can be prevented. If oxygen permeability is too large, it cannot prevent discoloration or deterioration of contents.

[0018]

Especially as an oxygen filter layer of this invention, although not limited, after carrying out the coat of the solution of a high molecular compound, or the solution of the mixture of a high molecular compound and an inorganic compound, the layer which vapor-deposited and prepared the layer metallurgy group oxide dried and prepared can be mentioned.

As an example of the high molecular compound to be used, a Parma call value like polyvinyl alcohol system resin or vinylidene-chloride system resin can mention the resin of 75 or more cal/cc, acrylic resin given in JP,2000-37822,A, etc. As an approach of preparing such an oxygen filter layer, although you may prepare after film production of a film, it can also prepare at the time of film film production. For example, after carrying out the coat of the oxygen filter layer to the film after vertical uniaxial stretching in a biaxial-stretching method serially, there is an approach of extending horizontally and

heat-treating after that or the approach of carrying out a coat and drying after a biaxially oriented film.

[0019]

Silicon oxide and/or an aluminum oxide can be mentioned as a metallic oxide. These oxide may be prepared with vacuum evaporation technique, and in the case of silicon oxide, a reactant gas, oxygen, etc. of a silicon compound like hexa methyl disiloxane are supplied to the plasma state, it may make them react, and may be established by the approach of preparing in a film front face.

[0020]

It is desirable to prepare an under-coating layer in the front face of the polyester film of this invention beforehand, and to establish an oxygen filter layer in up to it so that the oxygen filter layer prepared by this invention may stick well with polyester film, or so that the engine performance of an oxygen filter layer can fully demonstrate. It is desirable that there is this under-coating layer especially when an oxygen filter layer is a metallic oxide. Although it may be prepared after film production of a film, when the under-coating layer of this invention takes cost into consideration, it is desirable to prepare at the time of film production. For example, after carrying out the coat of the under-coating layer to the film after vertical uniaxial stretching in a biaxial-stretching method serially, there is an approach of extending horizontally and heat-treating after that or the approach of carrying out a coat and drying after a biaxially oriented film. Although there is no constraint in an approach, the approach of carrying out a coat to an uniaxial stretched film, carrying out horizontal extension subsequently, and heat-treating is [the descriptions, like a coat layer can be made thin to homogeneity] and is desirable.

[0021]

Although the aqueous macromolecule dissolved, emulsified or suspended is desirable in water, for example, can mention polyurethane system resin, Pori acrylic resin, polyester system resin, an epoxy resin, polyvinyl alcohol system resin, polyvinylidene chloride system resin, polystyrene system resin, polyvinyl pyrrolidones, these copolymers, etc. to it as such an under-coating layer, it is not limited to these. Moreover, these compounds are independent, or two or more sorts can be mixed and used for them.

[0022]

Moreover, in this invention, in order to improve the solvent resistance of a coat layer, a water resisting property, blocking resistance, and abrasion-proof nature, it is desirable to use a cross linking agent as a component of coat liquid. As a cross linking agent, compounds, such as methylol-izing or a urea system formed into the ARUKI roll, a melamine system, a guanamine system, an acrylamide system, and an amide system, an epoxy compound, an aziridine compound, polyisocyanurate, block poly isocyanate, an oxazoline radical content water solubility polymer, a silane coupling agent, a titanium coupling agent, and a zircoaluminate coupling agent are mentioned. Moreover, in order to improve coat nature, inorganic, an organic particle, lubricant, an antistatic agent, a defoaming agent, etc. may be made to contain in coat liquid in the range which does not spoil the effectiveness of this invention.

[0023]

As an approach of carrying out the coat of the coat liquid to polyester film, a spreading technique as shown in Yuji Harasaki work, Maki-Shoten Publishing, the 1979 issue, and a "coating method" can be used, for example. Specifically, techniques, such as an air

doctor coating machine, a blade coating machine, a rod coating machine, a knife coating machine, a squeeze coating machine, a sinking-in coating machine, a reverse roll coater, a transfer roll coater, a gravure coating machine, a kiss roll coating machine, a cast coating machine, a spray coater, a curtain coating machine, a calender coating machine, an extrusion coating machine, and a bar coating machine, are mentioned.

[0024]

[Example]

Although an example is given to below and this invention is further explained to a detail, this invention is not limited to the following examples, unless the summary is exceeded. In addition, the evaluation approach in an example and the example of a comparison and the art of a sample are as follows. Moreover, the "section" in an example and the example of a comparison shows the "weight section."

[0025]

(1) The measuring method of the limiting viscosity $[\eta]$ (dl/g) of a polymer
Polymer 1g was dissolved into 100ml of mixed solvents of a phenol / tetrachloroethane =50 / 50 (weight ratio), and it measured at 30 degrees C with the Ubbelohde viscometer.

[0026]

(2) The measuring method of a film haze

According to JIS-K7105, the film haze was measured by Nippon Denshoku Industries integrating-sphere type turbidity meter NDH-20D.

[0027]

(3) The measuring method of the light transmission of 380 nm

With the spectrophotometer UV 3100 by Shimadzu Corp., the low speed was measured for scan speed, light transmission was continuously measured for the sampling pitch in 2nm, and wavelength the field of 300-700nm, and the light transmission in 380nm wavelength was detected.

[0028]

(4) The measuring method of oxygen permeability

Based on JISK-7126, it measured at the temperature of 25 degrees C, and 60% of humidity with the equal pressure method.

[0029]

(5) The measuring method of the thickness of a laminating polyester layer

After carrying out fixed shaping of the film wafer with an epoxy resin, the microtome cut and the cross section of a film was observed with the transmission electron microscope photograph. An interface is observed by 2 and light and darkness almost in parallel with a film front face among the cross section. The distance to the two interfaces and film front face was measured from ten photographs, and the average was made into laminating thickness.

[0030]

The polyester raw material used in the following examples and examples of a comparison was manufactured by the following approach.

<The manufacturing method of Chip A>

By the usual melting hotel polymerization method Amorphous silica with a mean particle diameter of 2.5 micrometers The polyester chip of melt viscosity 0.66 which carries out 0.12 section content was obtained.

[0031]

<The manufacturing method of Chip B>

The twin screw extruder with a vent was presented with Chip A, melting kneading was supplied and carried out, chip-ization was performed so that it might become concentration 10% of the weight as an ultraviolet ray absorbent about 2 and 2-(1, 4-phenylene) screw [4H-3 and 1-benzoxazine-4-ON] (CYASORB UV-3638 made from CYTEC molecular weight 369 benzoxazine system), and the ultraviolet ray absorbent masterbatch polyester chip (CHITSUB) was manufactured. The limiting viscosity of the obtained polyester was 0.59.

[0032]

<The manufacture approach of Chip C>

A twin screw extruder with a vent is presented with Chip A, and it is an ultraviolet ray absorbent. Melting kneading was supplied and carried out, chip-ization was performed so that it might become concentration 10% of the weight about a 2-(4, 6-diphenyl-1,3,5-triazine-2-IRU)-5-[(hexyl) oxy-]-phenol (the tinuvin 1577 made from tiba SUPESHARITTEI, triazine system UV absorbent), and ultraviolet ray absorbent masterbatch polyester (chip C) was manufactured. The limiting viscosity of the obtained polyester was 0.59.

[0033]

Example 1

The mixed raw material which used Chip A as the raw material of I layers, and mixed Chip A and Chip B at 90% and 10% of a rate, respectively as a raw material of II layer After supplying each to two sets of extruders and fusing at 285 degrees C respectively, I layers were made as the outermost layer (surface), by making II layer into the middle class, casting drum lifting cooled at 40 degrees C was made to carry out co-extrusion cooling solidification by two-sort the lamination of three layers (I/II/I), and the non-orientation sheet was obtained to it. Subsequently, it extended 3.5 times perpendicularly at 85 degrees C - 100 degrees C, and the vertical uniaxial stretched film was obtained. This film It extended 4.0 times horizontally in the 85 degrees C - 110 degrees C ambient atmosphere, subsequently it heat-treated at 235 degrees C, and biaxial extension polyester film with a thickness of 16 micrometers was obtained. The thickness configurations of this film were 2 micrometers / 12 micrometers / 2 micrometers. The loadings of the ultraviolet ray absorbent to a inner layer were 1.0%. The light transmission of 380nm was film haze 4% 18%. The light transmission of 350nm was 0.8% by reference.

[0034]

Example 2

Biaxial extension polyester film with a thickness of 16 micrometers was obtained by the same approach as an example 1 except mixing Chip A and Chip B of II layer at 80% and 20% of a rate, respectively. The thickness configurations of this film were 2 micrometers / 12 micrometers / 2 micrometers. The loadings of the ultraviolet ray absorbent to a inner layer were 2.0%. The light transmission of 380nm was film haze 4% 6%. The light transmission of 350nm was 0.2% by reference.

[0035]

Example 3

Biaxial extension polyester film with a thickness of 16 micrometers was obtained by the same approach as an example 1 except mixing Chip A and Chip B of II layer at 70% and 30% of a rate, respectively. The thickness configurations of this film were 2 micrometers

/ 12 micrometers / 2 micrometers. The loadings of the ultraviolet ray absorbent to a inner layer were 3.0%. The light transmission of 380nm was film haze 4.5% 1.5%. The light transmission of 350nm was 0.05% by reference.

[0036]

Example 4

Biaxial extension polyester film with a thickness of 16 micrometers was obtained by the same approach as an example except mixing Chip A and Chip C for the configuration of II layer at 70% and 30% of a rate, respectively. The thickness configurations of this film were 2 micrometers / 12 micrometers / 2 micrometers. The loadings of the ultraviolet ray absorbent to a inner layer were 3.0%. The light transmission of 380nm was film haze 5.0% 28%. The light transmission of 350nm was 0.2% by reference.

[0037]

Example 5

Biaxial extension polyester film with a thickness of 16 micrometers was obtained by the same approach as an example except mixing Chip A and Chip B for the configuration of II layer at 10% and 90% of a rate, respectively. The thickness configurations of this film were 2 micrometers / 12 micrometers / 2 micrometers. The loadings of the ultraviolet ray absorbent to a inner layer were 9.0%. The light transmission of 380nm was 0.1% or less, and was film haze 5.0%.

[0038]

Example 6

After supplying gradually and distributing homogeneity, stirring 95-mol % of polyvinyl alcohol to 75-degree C hot water a degree of polymerization 200 and whenever [saponification], it cooled, after carrying out filtration and 20% of PVA water solution was prepared. In addition, SAFI Norian 440 (Nissin Chemical Industry Co., Ltd. make) was blended 0.1% in order to improve coat nature. Corona treatment of the front face of the film of an example 2 is carried out, and it gets wet, and is 56 dynes/cm about tension. It considers as the above, the coat of this **** is carried out to that field, and it is coat thickness. The film of 2-micrometer PVA was prepared. The oxygen permeability of this film was ten cc/[m] 2 and day-atm.

[0039]

Example 7

It vapor-deposited so that it might become the thickness of 20nm to the polyester film of an example 2 about an aluminum oxide, and the vacuum evaporation film was obtained. The oxygen permeability of this film was seven cc/[m] 2 and day-atm.

[0040]

Example 8

The mixed raw material which used Chip A as the raw material of I layers, and mixed Chip A and Chip B at 80% and 20% of a rate, respectively as a raw material of II layer After supplying each to two sets of extruders and fusing at 285 degrees C respectively, I layers were made as the outermost layer (surface), by making II layer into the middle class, casting drum lifting cooled at 40 degrees C was made to carry out co-extrusion cooling solidification by two-sort the lamination of three layers (I/II/I), and the non-orientation sheet was obtained to it. Subsequently, it extended 3.5 times perpendicularly at 85 degrees C - 100 degrees C, and the vertical uniaxial stretched film was obtained. On this film, it swerves from Resin a, Resin b, Resin c, and Resin d of a publication to the

following, ** 35, 30, and 25 and water medium spreading which carried out 10 weight sections combination are applied to one side of a film, and it extends 4.0 times horizontally in a 85 degree C - 110 degrees C ambient atmosphere further, and, subsequently heat-treats at 235 degrees C on it. The biaxial oriented film of the film thickness of 16 micrometers and 0.1 micrometer[in thickness of an under-coating layer] ** was obtained. The thickness configurations of this film were 2 micrometers / 12 micrometers / 2 micrometers. The loadings of the ultraviolet ray absorbent to a inner layer were 2.0%. The light transmission of 380nm was film haze 4.3% 6%. To the field of the under-coating layer of this film, silicon oxide was vapor-deposited so that it might become the thickness of 20nm, and the vacuum evaporation film was obtained. The oxygen permeability of this film was three cc/[m] 2 and day-atm.

[0041]

- Resin a : aqueous acrylic resin

The solution polymerization of the mixture of the ethyl-acrylate 40 weight section, the methyl-methacrylate 30 weight section, the methacrylic-acid 20 weight section, and the glycidyl methacrylate 10 weight section is carried out in ethyl alcohol, and it heats, adding the water after a polymerization, and ethyl alcohol is removed. Aqueous ammonia adjusted to pH7.5 and the coating liquid of aqueous acrylic resin (non-emulsifier type) was obtained.

[0042]

- the NIPPON SHOKUBAI Co., Ltd. make which is a resin b:oxazoline radical content water solubility polymer solution (water: 1-methoxy-2-isopropanol =1:2) -- EPO cross WS-500 were used.

[0043]

- Resin c : aqueous polyurethane system resin water paint

First, the polyester polyol which consists of the terephthalic-acid 664 weight section, the isophthalic acid 631 weight section, the 1,4-butanediol 472 weight section, and the neopentyl glycol 447 weight section was obtained. Subsequently, the adipic-acid 321 weight section and the dimethylol-propionic-acid 268 weight section were added to the obtained polyester polyol, and the pendant carboxyl group content polyester polyol A was obtained. Furthermore, the hexamethylene di-isocyanate 160 weight section was added to the above-mentioned polyester polyol A 1880 weight section, and the aqueous polyurethane system resin drainage system coating was obtained.

[0044]

- Resin d : moisture powder type polyester which has a carboxyl group
the Nippon Synthetic Chemical Industry make -- Pori Ester WR-961 were used.

[0045]

The example 1 of a comparison

After mixing Chip A and Chip C at 70% and 30% of a rate, respectively and fusing at 285 degrees C by one set of an extruder, it extrudes to casting drum lifting cooled at 40 degrees C, cooling solidification was carried out, and the non-orientation sheet was obtained. Subsequently, it extended 3.5 times perpendicularly at 85 degrees C - 100 degrees C, and the vertical uniaxial stretched film was obtained. This film It extended 4.0 times horizontally in the 85 degrees C - 110 degrees C ambient atmosphere, subsequently it heat-treated at 235 degrees C, and biaxial extension polyester film with a thickness of 16 micrometers was obtained. this time -- a mouthpiece -- the problem was in

productivity because of contamination of equipment, like the dirt of sublimation of the ultraviolet ray absorbent in the section or the roll in a film production process is conspicuous.

[0046]

The example 2 of a comparison

Biaxial extension polyester film with a thickness of 16 micrometers was obtained by the same approach as an example 1 except mixing Chip A and Chip B of II layer at 98% and 2% of a rate, respectively. The thickness configurations of this film were 2 micrometers / 12 micrometers / 2 micrometers. The loadings of the ultraviolet ray absorbent to a inner layer were 0.2%. The light transmission of 380nm was film haze 4% 60%. The light transmission of 350nm was 20% by reference. Ultraviolet-rays cutoff capacity was insufficient for this film, and it was not able to prevent discoloration of contents.

[0047]

The example 3 of a comparison

Biaxial extension polyester film with a thickness of 16 micrometers was obtained by the same approach as an example 5 except considering the configuration of II layer as Chip B. The thickness configurations of this film were 2 micrometers / 12 micrometers / 2 micrometers. The loadings of the ultraviolet ray absorbent to a inner layer were 10.0%. The light transmission of 380nm is 0.1% or less, and there was no effectiveness of increasing the quantity of an ultraviolet ray absorbent further.

[0048]

[Effect of the Invention]

According to this invention, the biaxial-stretching polyester film for gas cutoff films which was excellent in ultraviolet-rays cutoff nature, and was excellent in transparency can be offered, and industrial worth of this invention is high.